

PRODUCTIVITY AND QUALITY IN SPANISH PUBLIC HOSPITALS

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MAIN OBJECTIVE: Analyse the performance of different public providers of hospital care with special reference to quality index

1. Technical background: Malmquist Productive Index (1953)

$$IM(x^{t+1}, y^{t+1}, x^t, y^t) = \left[\frac{d_{CRS}^t(x^{t+1}, y^{t+1})}{d_{CRS}^t(x^t, y^t)} \cdot \frac{d_{CRS}^{t+1}(x^{t+1}, y^{t+1})}{d_{CRS}^{t+1}(x^t, y^t)} \right]^{1/2}$$

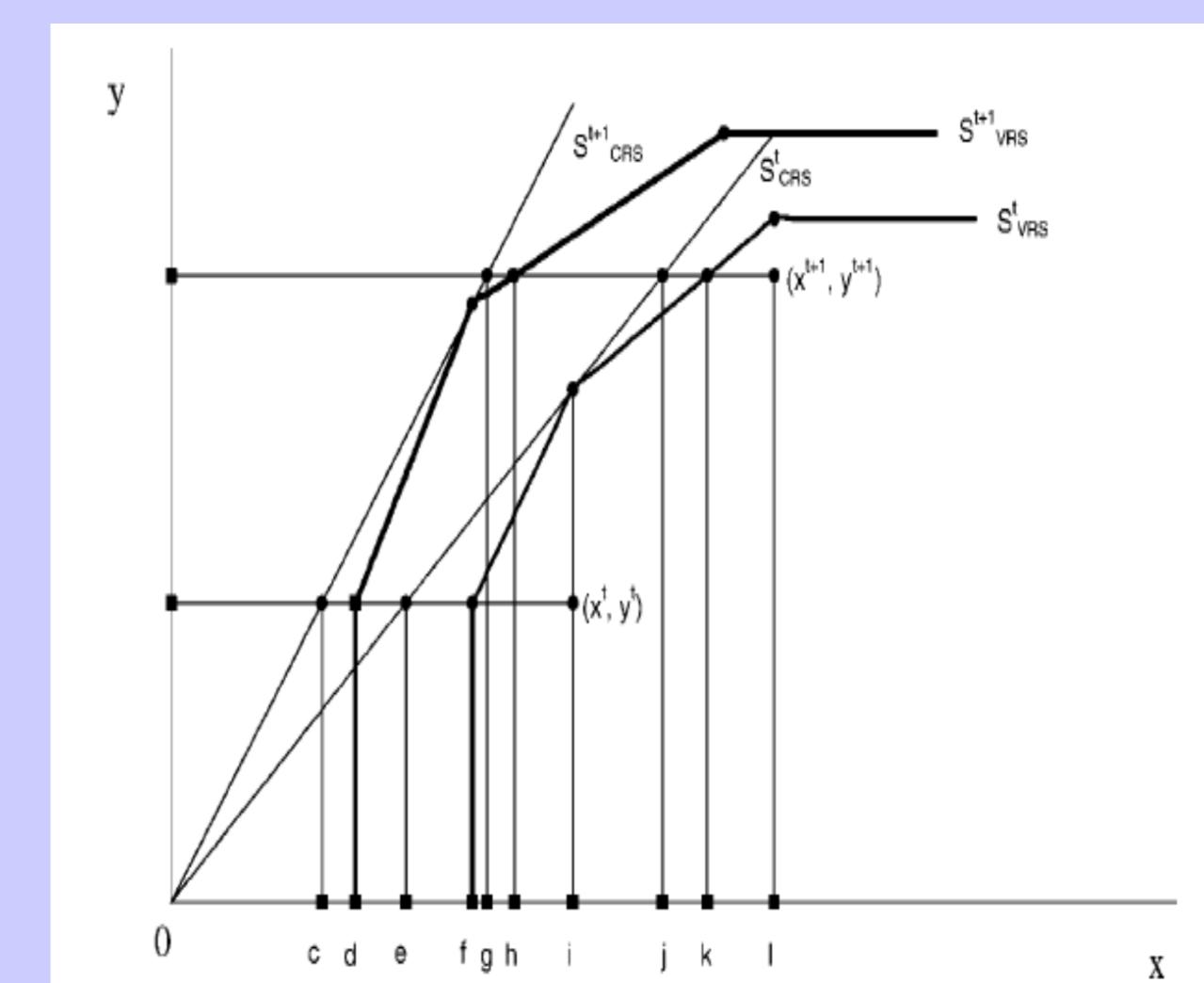
Färe, Grosskopf, Lingren y Roos (1989)

$$IM(x^{t+1}, y^{t+1}, x^t, y^t) = \frac{d_{CRS}^{t+1}(x^{t+1}, y^{t+1})}{d_{CRS}^t(x^t, y^t)} \left[\frac{d_{CRS}^t(x^{t+1}, y^{t+1})}{d_{CRS}^{t+1}(x^{t+1}, y^{t+1})} \cdot \frac{d_{CRS}^t(x^t, y^t)}{d_{CRS}^{t+1}(x^t, y^t)} \right]^{1/2}$$

EFFCH TECHCH

$$\sum_{j=1}^n \lambda_j = 1 \rightarrow EFFCH = \frac{d_{VRS}^{t+1}(x^{t+1}, y^{t+1})}{d_{VRS}^t(x^t, y^t)} \cdot \frac{d_{CRS}^{t+1}(x^{t+1}, y^{t+1}) / d_{VRS}^{t+1}(x^{t+1}, y^{t+1})}{d_{CRS}^t(x^t, y^t) / d_{VRS}^t(x^t, y^t)} = PECH \cdot SECH$$

Estimated with DEA (Charnes et al. 1978) - Input oriented



Sommersguter, M. (2000)

2. Framework for assessing hospital productivity:

131 hospitals (10 regions): 103 public managed & 28 NOF

Period: from 2003 to 2007

Inputs: Beds, Medical practitioners & nurses (*full equivalent*)

Outputs (1): Adjusted inpatient discharges, 3 quality indicators

Outputs (2): Adjusted inpatient discharges, emergencies, ambulatory surgery, outpatients (study in process)

EESRI – CMBD (IACS)

Undesirable Outputs

Necessary transformation

Andalucía (31), Aragón (10), Asturias (8), C. Valenciana (20), Cataluña (21), I. Canarias (5), I. Baleares (5), Galicia (14), La Rioja (2) y Madrid (15)

| | Mean | SD | Min | Max |
|-------------------------------|---------|---------|--------|----------|
| Beds | 483,6 | 408,0 | 52,0 | 1757,0 |
| Physicians | 380,4 | 363,3 | 17,5 | 1966,0 |
| Nurses | 1014,2 | 951,6 | 87,5 | 4722,0 |
| Adjusted Inpatient discharges | 31648,0 | 27679,1 | 1736,3 | 137459,4 |
| Quality Index 1 | 1,0 | ,0 | 1,0 | 1,0 |
| Quality Index 2 | 1,0 | ,0 | 1,0 | 1,0 |
| Quality Index 3 | ,9 | ,0 | 0,8 | 1,0 |

3. Results:

| Malmquist Index | 2003/2004 | 2004/2005 | 2005/2006 | 2006/2007 |
|--------------------------|-----------|-----------|-----------|-----------|
| Public management | 1,014 | 0,914 | 1,092 | 0,905 |
| Max progress | 0,778 | 0,675 | 0,803 | 0,604 |
| Max regress | 1,28 | 1,33 | 1,61 | 1,25 |
| Nº Hosp in progress | 45 | 83 | 30 | 77 |
| Nº hosp in regres | 58 | 20 | 73 | 26 |
| NOF | 1,039 | 0,92 | 1,083 | 0,837 |
| Max progress | 0,778 | 0,675 | 0,771 | 0,618 |
| Max regress | 1,33 | 1,33 | 1,62 | 1,18 |
| Nº Hosp in progress | 11 | 17 | 9 | 23 |
| Nº hosp in regres | 17 | 11 | 19 | 5 |

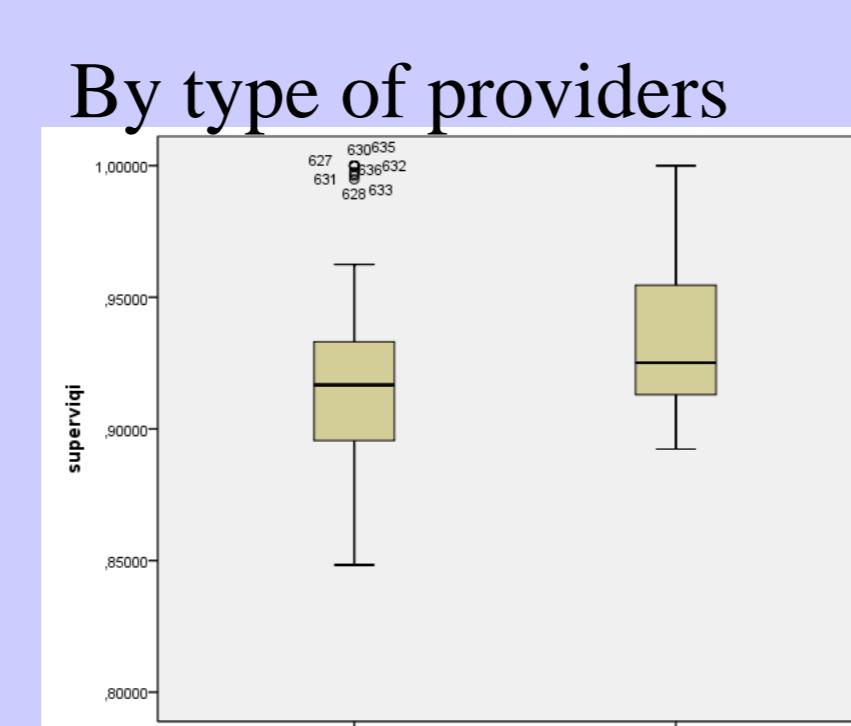
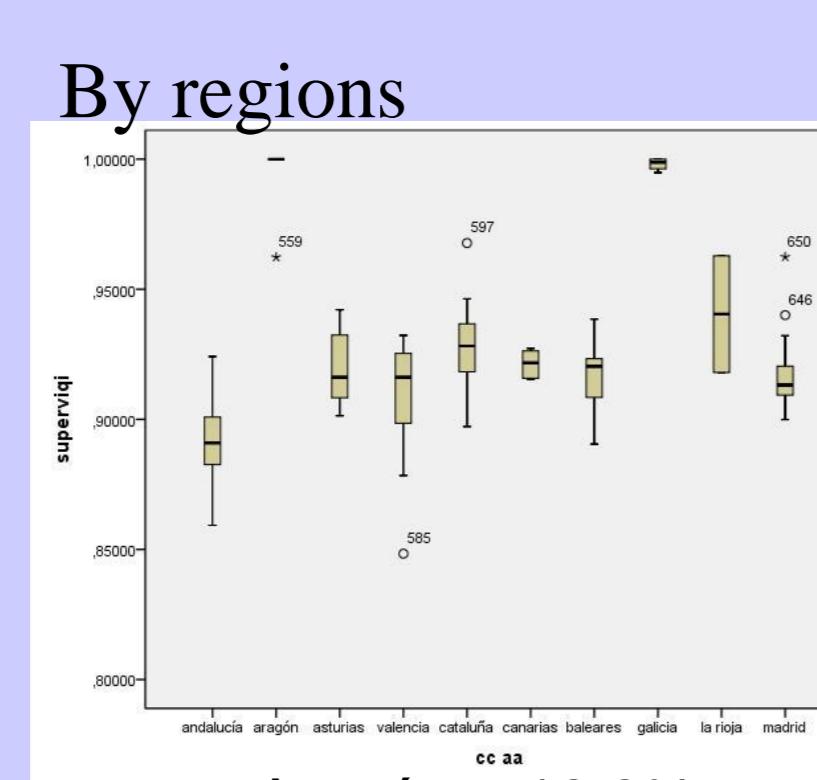
| Decomposition of Malmquist Index | 03/04 | 04/05 | 05/06 | 06/07 |
|----------------------------------|-------|-------|-------|-------|
| Public management | | | | |
| TECHCH | 1,00 | 0,97 | 0,95 | 1,05 |
| PECH | 1,06 | 0,91 | 1,05 | 0,95 |
| SECH | 0,97 | 1,06 | 1,13 | 0,93 |
| EFFCH | 1,02 | 0,95 | 1,17 | 0,87 |
| NOF | | | | |
| TECHCH | 0,98 | 0,98 | 0,94 | 0,94 |
| PECH | 1,05 | 0,96 | 1,03 | 0,96 |
| SECH | 1,02 | 1,01 | 1,10 | 0,96 |
| EFFCH | 1,07 | 0,96 | 1,13 | 0,91 |

| Temporal Evolution Technical Efficiency (VRS) | 2003 | 2004 | 2005 | 2006 | 2007 | Var. 03-07 |
|---|-------|------|------|------|------|------------|
| Public management | 79,56 | 76 | 94,2 | 91,8 | 96,1 | 20,8 |
| Nº of efficients | 17 | 16 | 21 | 27 | 30 | |
| % of efficients | 16,5 | 15,5 | 20,4 | 26,2 | 29,1 | |
| NOF | 91,9 | 87,6 | 91,6 | 89,9 | 94,1 | 2,4 |
| Nº of efficients | 15 | 8 | 14 | 11 | 14 | |
| % of efficients | 53,6 | 28,6 | 50 | 39,3 | 50 | |

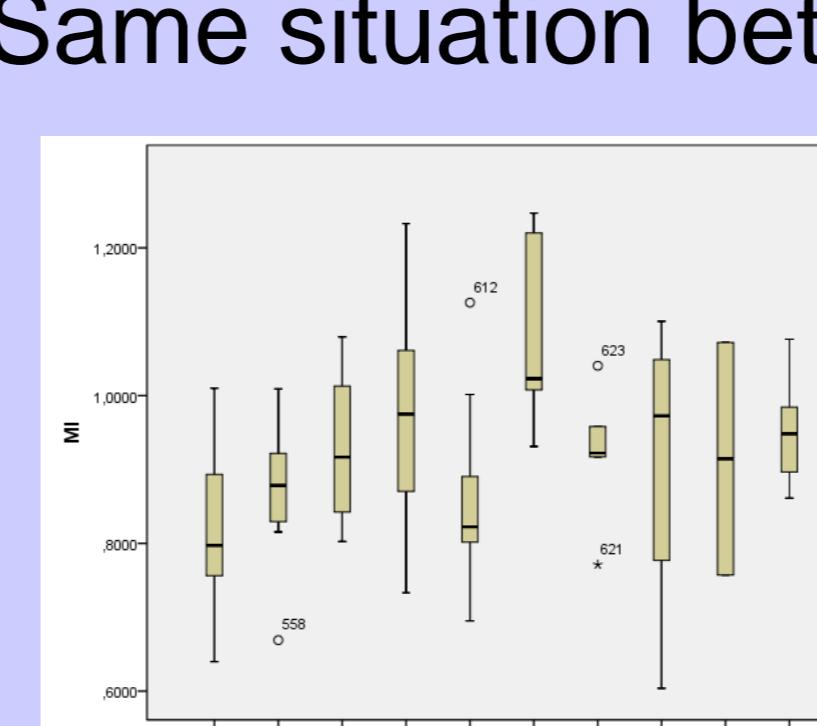
4. Discussion:

Quality Index:

Interest in using quality indicators: to measure the technique performance appraisal – validated by health ministry



¿Same situation between regions?



¿Possible corkage effect?

¿Size effect?

¿Relation with Public health spending per capita?